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Theater Missile Defense: Indigenous Programs and Interest Among U.S. Friends and Allies

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THEATER MISSILE DEFENSE: INDIGENOUS PROGRAMS AND INTEREST AMONG U.S. FRIENDS AND ALLIES

SUMMARY

The threat posed by weapons of mass destruction and their means of delivery, especially missiles, is a growing international concern. Most nations seek to deal with this threat through a combination of arms control and military measures. Only a few allies and friends of the United States, however, appear apprehensive and are considering or seeking to acquire advanced theater missile defense (TMD) capabilities to deal with these threats.

Some nations are satisfied with the limited TMD capability they have in the Patriot antitactical missile system, which is designed to defend small areas. Some nations in Europe, such as France and Germany, are beginning to think about acquiring TMD to defend troops they may have deployed overseas in peacekeeping roles, for example. Likewise, nations such as Japan, South Korea, and Taiwan are considering TMD development and procurement in response to perceived regional threats. But only in the case of Israel does a U.S. friend or ally appear committed to acquiring additional TMD capabilities.

TMD efforts among U.S. allies and friends are revealing. Most countries who have acquired Patriot antitactical missile systems have negotiated offset agreements that ensure there is not an excessive flow of resources or money out of their country. A number of countries have also received contracts from the United States to conduct TMD research and development, investing relatively little of their own resources. There is little other TMD cooperation among U.S. allies and friends, and the only indigenous TMD programs in other countries remain simply options as they upgrade their air-defense capabilities.

The principal reasons these countries do not support TMD efforts with greater commitment appear to be their perception of the threat and other budgetary priorities. Some friendly nations also question the wisdom of procuring systems that quickly may become technologically obsolete, or may be inadequate for defense at this time. U.S. allies and friends also cite political sensitivities in openly debating regional threats, as well as a host of barriers to international technological cooperation with the United States.

U.S. allies and friends largely appear willing to accept the U.S. technological lead in pursuing TMD, but they do not evidence eagerness or willingness to share the resource burden in developing TMD systems. While some nations may acquire mature TMD systems in the future--with accompanying offset agreements likely in most cases--others may be satisfied with the various security guarantees provided by the United States, including possible deployment of U.S. TMD capabilities in their own countries. Only a few may seek to purchase future U.S. TMD systems outright.

CONTENTS

INTRODUCTION AND OVERVIEW	1
ALLIED PERCEPTIONS OF THEATER MISSILE THREATS	3
NEAR-TERM THREATS GENERATING URGENT RESPONSE	3
LONG-TERM THREATS PRODUCING INDEFINITE RESPONSE ..	5
ROLE OF THEATER MISSILE DEFENSES	5
DETERRENCE AND THEATER MISSILE DEFENSE	5
THEATER MISSILE DEFENSE MISSIONS	7
Point Defenses of National Assets	7
Wide-Area or Nationwide Defenses	8
Defense of Expeditionary Forces	8
THEATER MISSILE DEFENSE EFFORTS	8
COOPERATION WITH THE UNITED STATES	10
Cooperative TMD Research and Development	10
Purchases of Patriot Systems	10
With Offset Agreements	11
Foreign Military Sales Purchases	12
Prospective Purchases	12
Cooperation With New U.S. TMD Capabilities	13
COOPERATION WITH REGIONAL PARTNERS	15
INDIGENOUS PROGRAMS	18
Air-Defense Upgrades	19
Europe	19
Asia	20
Dedicated Theater Missile Defenses	21
CONSTRAINTS	23
BUDGETARY	23
POLITICAL	23
BARRIERS TO TECHNOLOGY COOPERATION	23
CONCERNS OVER TECHNOLOGICAL EFFICACY	24
CONCLUSION	24

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THEATER MISSILE DEFENSE: INDIGENOUS PROGRAMS AND INTEREST AMONG U.S. FRIENDS AND ALLIES

INTRODUCTION AND OVERVIEW

Missile attacks have become a notable feature of modern warfare. Within the past decade, a number of such attacks have occurred. French-built Exocet missiles launched by Argentina destroyed a British destroyer and damaged another in the 1982 Falklands/Malvinas war. A U.S. guided-missile frigate also was damaged heavily by an Exocet missile launched by Iraq in 1987. In 1986, Libya launched Soviet-built Scud missiles against a U.S. facility in Italy. During 1980-1988, Iran and Iraq attacked each other with more than 600 Scuds. More recently, during the 1991 Gulf War, Iraq launched almost 90 Scud missiles against targets in Israel and Saudi Arabia.

Generally, two basic approaches are taken to counter the potential threat of missile attacks. Many nations favor a range of arms control and export control efforts aimed at slowing or reversing the global proliferation of weapons of mass destruction and their means of delivery. Many nations also rely on a variety of military solutions to deal with these threats. These solutions include acquiring offensive military means to deter aggression and to be able to destroy another nation's ability to carry out missile attacks, as well as defensive means to destroy attacking missiles in flight. This latter capability is known as ballistic missile defense.

Theater missile defenses (TMD) are defensive military systems designed to attack and destroy theater range missiles. Typically, the launch point of these attacking missiles and their intended target lie within a theater or region.¹ TMD systems generally would seek to engage and destroy short-range missiles with ranges of less than about 1,000 kilometers (about 620 miles), or longer-range theater ballistic missiles with ranges of 1,000 - 3,000 kilometers (between 620 and 1,860 miles).

The United States supports a number of TMD programs and initiatives within the Defense Department's Ballistic Missile Defense Organization (BMDO), known formerly as the Strategic Defense Initiative Organization. These include several point defense interceptor capabilities, such as further upgrading the Patriot antitactical missile defense system (used during the 1991 Persian Gulf War), giving both the Navy's Standard Missile and the Army's Hawk air-defense missile systems limited TMD capabilities, as well as developing newer TMD systems such as Corps SAM (surface-to-air missile). To safeguard

¹ These include ballistic missiles, cruise missiles, or air-to-surface missiles.

larger areas, the United States is also pursuing two wide-area defense interceptor programs, including the Army's ground-based THAAD (Theater High Altitude Area Defense), and a Navy upper-tier or high-altitude intercept system.²

The United States leads all other nations in terms of total resources spent on developing a wide range of TMD systems. Current Pentagon plans call for almost \$18 billion in TMD spending from fiscal years (FY) 1995-1999. There are no current or prospective theater missile threats to U.S. territory. The TMD program's basic rationale is "to provide highly effective TMD to forward deployed and expeditionary forces and to friends and allies of the United States."³

Various policymakers, however, have begun to question the nation's resource commitment to TMD. Some ask, for example, whether the United States should pursue so many TMD programs, some of which are considered redundant. Others question whether the United States alone should develop and deploy TMD systems that are largely seen as benefitting the interests of and defending the territories of U.S. allies and friends around the world. Some suggest that U.S. allies and friends should play a greater role in sharing the resource burden that will be incurred over this decade. Finally, others ask why U.S. allies and friends are not more concerned about threats of theater missile attacks and question whether the U.S. commitment to TMD is warranted.

This report summarizes some of the basic views held by U.S. allies and friends toward current and potential missile threats. The report also summarizes some of the current thinking in those countries about the role and utility of TMD systems. Transfers of TMD systems and current TMD development programs and initiatives within these countries are examined. Finally, the report briefly discusses some of the perceived constraints shared by some U.S. allies and friends in supporting a greater commitment to TMD.

It should be pointed out that most U.S. allies and friends have not manifested any interest in pursuing theater missile defenses. The scope of this report is therefore limited to friends and allies who have expressed some official interest in TMD. In Europe, these countries are the United Kingdom, France, Germany, Italy, and the Netherlands. In the Middle East, they are Israel, Saudi Arabia, Kuwait, and Turkey. And in Asia, the countries include Japan, South

² For more details on theater missile defense programs, policy, and issues, see: Steven A. Hildreth. U.S. Library of Congress. Congressional Research Service. Theater Missile Defense Policy, Missions, and Programs: Current Status. CRS Report for Congress No. 93-585F. June 10, 1993; and Steven A. Hildreth. U.S. Library of Congress. Congressional Research Service. Theater Missile Defense: Issues for the 103rd Congress. CRS Issue Brief, updated regularly.

³ P.L. 102-190, Sections 231-236. National Defense Authorization Act. These sections are known as the Missile Defense Act.

Korea, and Taiwan. Although Russia has an operational TMD capability available for export and other developmental programs underway, the country is not included in this report.

Among many friends and allies of the United States, there is some level of discussion and debate over theater missile defenses. Oftentimes these discussions take place within academic communities, private industry, or among interested groups or decisionmakers, or some combination of them.⁴ This report strives to identify interest in, support for, and commitment to TMD at the national policymaking level among U.S. allies and friends.

ALLIED PERCEPTIONS OF THEATER MISSILE THREATS

This section summarizes some of the basic views held by U.S. friends and allies toward current and prospective theater missile threats. These views can be placed into two groups: 1) near-term threats, which may require some urgent TMD response; and 2) longer term threats, which may not produce an urgent commitment to TMD. Generally, U.S. friends and allies do not appear to share a similar sense of anxiety over global missile proliferation as do many U.S. policymakers. These points are discussed below.

NEAR-TERM THREATS GENERATING URGENT RESPONSE

Among U.S. allies and friends, several countries appear to be significantly concerned about short-range ballistic missile threats and have acquired some limited TMD capability in the Patriot antitactical missile system.⁵ These countries are Israel, Saudi Arabia, Kuwait, Japan, and South Korea (through the deployment of U.S. Patriot systems there). Some NATO members, such as Germany and the Netherlands also have Patriot systems, and others, such as Italy, may acquire it.

Currently, Israel is the only country committed to acquiring further advanced TMD capabilities beyond the Patriot systems they acquired. Israel is

⁴ Two very useful reviews of public statements made by various political and other leaders supporting some role for TMD are: National Institute for Public Policy. Recent Selected Statements by European Leaders in Support of Ballistic Missile Defense. Fairfax, VA. May 11, 1993; and National Institute for Public Policy. Proliferation and Missile Defense: European-Allied and Israeli Perspectives. Fairfax, VA. June 1993.

⁵ For a broad, global review of missile and weapons of mass destruction proliferation, see U.S. Library of Congress. Congressional Research Service. Missile Proliferation: A Discussion of U.S. Objectives and Policy Options. CRS Report No. 90-120F. Washington, D.C. February 21, 1990. pp. 3-6. Also, U.S. Department of Defense. Strategic Defense Initiative Organization. Ballistic Missile Proliferation: An Emerging Threat. 1992. Washington, D.C.

very concerned about the immediate and potential threat of ballistic missiles and the warheads they could carry. Israel has viewed this threat as serious for some time. Syria, Libya, Iran, Yemen, Egypt, and Iraq possess short-range ballistic missiles with ranges up to 600 kilometers (about 375 miles). Saudi Arabia has intermediate-range Chinese-built missiles (about 1,860 miles). North Korea has apparently shown an interest in exporting missiles to countries in the region. In addition, several countries in the Middle East have programs to produce, develop, or acquire weapons of mass destruction.

Taiwan has also expressed an interest in developing or acquiring a point-defense TMD capability. Hedging against a potential Chinese ballistic missile threat, Taiwanese officials are investigating TMD as a possible defensive measure. In specific, Taipei is simultaneously negotiating a co-production agreement with Raytheon for the Modern Air Defense System (MADS) and continuing indigenous research and development on the TK-2 air defense missile.

Other than Israel and Taiwan, the countries most concerned about possible missile threats are South Korea and Japan. Because of continued developments in North Korea, Seoul and Tokyo are increasingly interested in acquiring additional TMD capabilities. Both South Korea and Japan express anxiety over North Korea's development and recent testing of the No-Dong missile (range of about 1,000 kilometers). A newer missile, the No-Dong 2, reportedly may attain a range of between 1,500 - 2,000 kilometers. The continued development of the Taepo Dong 1 and 2 missiles, with ranges estimated by the Central Intelligence Agency at up to several thousand kilometers, have alarmed many in Asia and elsewhere. In addition, North Korea has a nuclear program whose scope and purpose remain unverified, controversial, and of mounting worry to the region and the world. Reportedly, North Korea also has a chemical weapons capability.

In March 1994, given potential hostilities on the Korean peninsula, President Clinton authorized the deployment of a Patriot battalion comprised of the most advanced PAC-2 equipment in the U.S. inventory. Whereas South Korea will probably not purchase its own Patriots outright, these missiles will help defend U.S. and other forces, as well as South Korean assets, from possible North Korean attacks. In addition, the United States has invited the Seoul government to participate in the THAAD program, although it is not clear what such participation would include at this stage of the program's development. South Korea has not yet responded to this initiative.

Japan has also been invited by the United States to cooperate on advanced TMD (i.e., codevelopment, coproduction, or licensed production), however, Japanese policymakers have not made a decision. Viewing regional threats from both North Korea and China, Japan has purchased several Patriot units, as well as Aegis-class cruisers and AWACS aircraft for defensive purposes. Japanese officials are interested in further pursuing advanced TMD, and are actively consulting with U.S. officials on their TMD options. With their five-year 1996-2000 defense budget due to parliament by the end of this year, decisions on TMD are forthcoming shortly.

Because they were attacked repeatedly throughout the 1991 Gulf War, Saudi Arabia and Kuwait remain sensitive to regional missile threats, but have not expressed publicly any commitment to acquire wide-area defenses beyond the capabilities of their Patriot PAC-2 systems purchased from the United States.

LONG-TERM THREATS PRODUCING INDEFINITE RESPONSE

Among other U.S. allies and friends there is growing general concern and some discussion over the global proliferation of weapons of mass destruction and their means of delivery, especially missiles. This notwithstanding, most countries express little urgency in developing or acquiring TMD systems for defense of national territories. Some countries, such as the United Kingdom and Japan, are investigating their TMD options for threats expected to emerge within the next decade or so. Germany already has limited TMD ability against short-range ballistic missiles in the Patriot system, and is awaiting further multilateral advanced TMD development options.

Other countries may publicly and generally acknowledge the potential risks of missile proliferation, but appear reluctant to discuss specific potential threats. For example, some observers note that France someday could face missile threats from North Africa (e.g., Algeria and Libya), yet French decisionmakers are reluctant to discuss this openly. There appears to be similar reticence for such debate in Italy and Turkey, each of which is potentially vulnerable from multiple lesser-developed states equipped with ballistic missiles. Italy and Turkey have limited TMD capabilities in the Patriot system, while France currently has none.

ROLE OF THEATER MISSILE DEFENSES

In terms of broader national security strategies, U.S. friends and allies assign different roles and importance to TMD. One country views TMD as subservient to its nuclear deterrent strategy. In another country, there is some discussion that TMD systems themselves might play a dominant deterrent role. Among most U.S. friends and allies, however, TMD is viewed as one element of larger national policies supporting arms control efforts and other military capabilities designed to slow or reverse global proliferation and deter regional aggression. These are discussed below.

DETERRENCE AND THEATER MISSILE DEFENSE

France is alone in asserting the primacy of its independent nuclear retaliatory force.⁶ For decades, French policymakers have argued that this capability is sufficient to deter others from attacking France with ballistic missiles armed with either conventional or other (i.e., chemical, biological, or

⁶ Interviews with French officials, May-June 1993.

nuclear) warheads. Typically, then, there has been little official public support for TMD. This view may be changing, however; France is looking at potential roles for TMD systems.

An important change was seen recently when the French government issued a White Paper on defense.⁷ This report analyzes the changing face of security threats in the post-Cold War era and details French defense programming and planning priorities to the year 2010. Significantly, this milestone report states that the:

proliferation of nuclear, biological and chemical weapons of mass destruction, associated or not with ballistic vectors, will pose new problems for our defense apparatus, as much for the protection of the national territory as for the French forces deployed externally. This challenge also concerns most of the countries of Europe and the Atlantic Alliance.⁸

The White Paper further states that the nature of proliferation requires multiple forms of response including measures of prevention, international sanctions, deterrence, and defensive actions (including extended air defense).

Perhaps departing from traditional French notions of nuclear primacy, the report further declares that "an equilibrium between the exercise of deterrence, the acts of prevention and interdiction, and the possible defenses must be sought in the military strategy to be defined for responding to these threats." In accordance with this, France apparently will fund preliminary demonstration programs of antitactical ballistic missile technology, and perhaps begin to acquire appropriate TMD systems in the next five years.⁹ Any decisions or commitments, however, have not been finalized and may not be made public.

Most allies and friends interested in TMD do not believe that the threat of offensive retaliation will deter all hostile states from considering or using ballistic missiles in a crisis or during war. Therefore, there is a greater willingness for some to consider TMD systems as part of their national security strategy. These countries include: Turkey, Israel, and Saudi Arabia--all of whom apparently believe their neighbors view ballistic missiles and weapons of mass destruction little differently from conventional weapons--as well as the United Kingdom, South Korea, Taiwan, and Japan. Moreover, the Netherlands and Germany have acquired a limited TMD capability (i.e., Patriot systems) as part of their formal alliance responsibilities.

⁷ Government of France. Livre Blanc sur la Defense 1994. Released February 23, 1994.

⁸ Ibid., p. 62.

⁹ Interview with Pentagon officials, April 1994.

Exemplifying this new willingness to consider ballistic missile threats and appropriate defensive military responses, the United Kingdom also is weighing possible TMD defensive systems. British Defense Secretary Malcolm Rifkind recently asserted that within ten years nations such as Libya could acquire ballistic missiles that would be capable of striking the U.K.¹⁰ Accordingly, the U.K. will fund a "pre-feasibility" study to determine whether or not to develop or acquire a TMD capability. This study, scheduled to begin this fall and continue through the beginning of 1996, will examine all systems being developed and under consideration. This study is expected to cost in the "single digits of millions of pounds,"¹¹ with the possibility of further study in the future. This study implies no commitment to acquire any TMD system.

Within Italy, still another perspective is seen. Here there is some support for the idea that missile defenses can serve not only to protect the country from missile attacks, but may well deter such attacks and even proliferation.¹² Unlike France and the United Kingdom, however, Italy's national priority for a TMD system is "quite low," with cost being a major factor.¹³ Italy perceives a growing proliferation threat, and recognizes the increasing need for TMD; but it currently has no commitment for any development or acquisition.

THEATER MISSILE DEFENSE MISSIONS

Because each of the above countries believes there may be some role for TMD, it is useful to examine the major missions these countries might envision for TMD. These missions include point defenses of specific assets, or very small areas; wide-area, or nation-wide defenses; and defense of troops deployed overseas. These are discussed briefly below.

Point Defenses of National Assets

To date, several countries have acquired or purchased Patriot missile systems for defending specific military assets or for use in defending small areas

¹⁰ Charles Miller. British Weigh Missile Defense Plan. Defense News. February 21-27, 1994. p. 38.

¹¹ Interview with British official, April 1994. Exact figures are unavailable because negotiations between the British government and private contractors are still underway. Calculated at £1=\$1.50, this contract could conceivably range between \$1.5 million and almost \$15 million dollars.

¹² This argument was made by Salvatore Ando (then Italy's Minister of Defense) at a meeting of the Western European Union on missile defense issues in Rome, April 1993. See Loveche, Joseph. European Ballistic Missile Defense: Big Plans, Lots of Talk, But Not Much Cash. Defense Week. April 26, 1993. pp. 1, 11.

¹³ Interview with Italian official, April 1994.

such as cities. These countries include: Germany and the Netherlands, as part of their NATO responsibilities; Italy, although the current status of negotiations is uncertain; Israel; Saudi Arabia and Kuwait, through FMS purchases; and Japan. In addition, U.S. Army Patriot units are deployed in South Korea. Several countries are looking to upgrade their air-defense capabilities with limited TMD capabilities. These countries include France, Germany, the United Kingdom, and Taiwan.

Wide-Area or Nationwide Defenses

Several countries are interested in acquiring a nationwide missile defense capability. Not surprisingly, these countries are among those identified earlier as being most threatened: Israel, South Korea and Japan. It remains unknown whether or not Saudi Arabia or Kuwait are interested. Some countries, however, do not foresee acquiring any wide-area defense capability. For example, Germany is specifically not interested for several reasons:¹⁴ 1) there are no current or prospective threats that require such a system; 2) there are no alliance obligations requiring such a system; and 3) a wide-area defense of Germany is problematic--missile interceptions would probably occur outside German territory, with debris falling (unacceptably) on other European countries. Only Israel appears committed at this point to acquire such defenses.

Defense of Expeditionary Forces

Over the past few years, there has been increasing willingness among some friends and allies to consider deploying troops outside their own countries as part of larger international peacekeeping forces. At the same time, there is concern that in some crises or regional hot spots, these troops may be at risk of attack from missiles. Hence, there is growing interest, but no commitment yet, in some countries, such as France, Germany, and the United Kingdom, to consider the acquisition of TMD capabilities to defend their troops overseas.

THEATER MISSILE DEFENSE EFFORTS

So, what exactly are these countries doing? This section describes ways in which U.S. allies and friends have cooperated with the United States in acquiring TMD systems and pursuing U.S.-funded TMD/SDI research and development. The section describes further a few TMD programs being pursued collaboratively between regional partners. Finally, a review is made of indigenous TMD programs among U.S. allies and friends. Chart 1 summarizes the various TMD efforts being pursued.

¹⁴ Interview with German officials, June 1993.

Chart 1
TMD Efforts (active defenses) of the United States and its Friends and Allies

	U.S. Programs	Cooperation with United States	Cooperation with Regional Partners	Indigenous Programs
<u>Air-Defense/TMD</u>	Hawk Navy SM-2 Patriot PAC-2 Growth Program Patriot PAC-3 Upgrade	TMD R&D Contracts many countries Purchases of Patriot systems (with offsets) The Netherlands, Italy, Germany, Israel, Japan (direct purchases) Saudi Arabia, Kuwait	SAMP-T? France and Italy SA-12B? France & Russia	TLVS? Germany MSAM? U.K. Future SAM Japan Tien Kung? Taiwan
<u>Dedicated TMD</u> Point Defenses Wide-Area Defenses	Corps SAM THAAD Navy Upper-Tier	TMD R&D Contracts Israel		Arrow/ACES (Israel)

COOPERATION WITH THE UNITED STATES

There are several ways in which U.S. allies and friends have traditionally cooperated with the United States on theater missile defense. First, U.S. friends and allies have received U.S. contracts for research on and development of theater missile defense concepts and programs. Second, U.S. allies and friends have purchased U.S. Patriot antitactical missile systems. Finally, U.S. friends and allies might cooperate on the development or acquisition of new U.S. TMD capabilities. These basic forms are discussed below.

Cooperative TMD Research and Development

Since 1985, U.S. allies and friends have participated in about 340 missile defense contracts. They have received slightly more than \$1 billion from the United States for this work. Most of this money was spent on TMD-related studies and for research and development (primarily to support the Israeli Arrow missile program). Reportedly, U.S. allies and friends contributed over \$100 million from their own resources to these projects.¹⁵

According to the BMDO, foreign participation has helped the U.S. missile defense effort. Basically, BMDO "has received widespread access to foreign technical expertise and innovative technology contributions."¹⁶ The extent to which any of this work may be incorporated into U.S. missile defense systems, especially TMD, is not known. (The Arrow program is discussed further under "Dedicated Theater Missile Defenses.")

Purchases of Patriot Systems

Several countries have purchased Patriot Air Defense Missile Systems (often referred to as Fire Units),¹⁷ which are produced by the Raytheon

¹⁵ U.S. Department of Defense. Report to Congress: Conceptual and Burden Sharing Issues Related to Space-Based Ballistic Missile Defense Interceptors. Washington, DC. March 1992. p. 27.

¹⁶ BMDO provided CRS with answers to questions about foreign contributions to U.S. missile defense in interviews, June 1993.

¹⁷ The basic U.S. Army Patriot configuration is a fire unit, consisting of several components physically separated from each other:

- 8 missile launchers (typically), each of which has 4 missiles (factory sealed in canisters) and 4 reload missiles (for each launcher), for a total of 64 missiles;
- a ground-based phased array radar for surveillance, target detection, tracking, and target engagement;
- an Engagement Control Station (ECS), manned by Army personnel, to provide either manual or automated command and control of the system; and

(continued...)

Company.¹⁸ Most of these contracts were made with accompanying offset agreements between the United States or Raytheon (or both) and the purchasing country. Two direct purchases of Patriot systems were made. A number of other countries are reportedly also interested in acquiring Patriot. These are addressed below.

With Offset Agreements

Most purchases of the Patriot system include offset agreements.¹⁹ Offsets include various forms of compensation as a condition of purchase.²⁰ In two cases where the Patriot system was purchased, offset agreements were required by law in those countries.²¹

- The Netherlands purchased four Patriot Fire Units valued at about \$200 million and required a \$197 million offset, which consisted of direct and indirect forms of technology and military cooperation, as well as logistics offsets. They are also studying the possibility of purchasing PAC-3 when it becomes available.
- A U.S. agreement with Italy calls for the transfer of twenty Fire Units. The United States will provide Italy with Patriot ground equipment

¹⁷(...continued)

● communications equipment and an electrical power generator.
Fire unit configurations may differ from country to country.

¹⁸ Information about whether these countries possess Patriot PAC-1 or more capable PAC-2 (Patriot Antitactical Missile Capability) systems remains classified and cannot be provided here.

¹⁹ Information regarding details of Patriot system sales and offsets was provided to CRS from the Raytheon Company, July 1993 and April 1994.

²⁰ "Offsets are a range of industrial and commercial compensation practices required as a condition of purchase in either government-to-government or commercial sales of defense articles and/or defense services as defined by the Arms Export Control Act and the International Traffic in Arms Regulations." The various types of offset agreements include co-production, licensed production, subcontractor production, technology transfer, counter-trade, and counter-purchase. Offsets result from a number of considerations that seek to improve the overall value of the sale from the buyer's perspective. See, Executive Office of the President of the United States. Office of Management and Budget. Offsets in Military Exports. April 16, 1990. pp. 8-9.

²¹ Most NATO countries require offsets. See North Atlantic Council. Initial Investigation of the Feasibility of Improving the Conditions of Defense Trade Between NATO Allies. Conference of National Armaments Directors. Report by the Task Group. Document AC/259-D/1437. March 12, 1991. Annex VI, p. 3.

(radars, ECS, etc.) in return for Italy providing short-range air-defense of U.S. assets located in Italy. Italy will purchase Patriot missiles, launchers, and other equipment from Italian industry in a co-production agreement with Raytheon. To date, however, the Italian government has not implemented its side of the U.S.-Italy Air Defense MOU (Memorandum of Agreement). The U.S. Congress set May 1994 as the deadline for them to do so. Some expect that Italy will not implement the MOU because of financial constraints, and the air defense agreement will expire.

Although not required by law, several other countries negotiated offsets as part of their Patriot contract.

- Germany agreed to procure 14 Patriot Fire Units at a value of \$1.16 billion and the United States agreed to provide Germany with 14 Fire Units, 12 of which will be operated by Germany. The production and logistics offsets to German industry are valued at about \$500 million.
- The United States provided Israel with two Fire Units, absorbing the costs of this grant under the Arms Export and Control Act. A third Fire Unit was funded by a grant from the German Government (valued at about \$105 million). In support of this contract, Raytheon agreed to meet the Israeli offset requirement of 30 percent of Raytheon's part of the procurement. Despite Israeli criticism of Patriot's performance in Desert Storm, Israel continues to rely on Patriot PAC-2 for TMD.
- Japan negotiated a direct commercial contract for the technology transfer of information and materials necessary for manufacturing the Patriot Missile System in Japan. Japan plans to manufacture 32 Fire Units. The agreement is valued at \$1.3 billion to Raytheon. In addition, Japan has requested PAC-3 technology (which includes upgrades to the missile and ground equipment). At this time, the license is being reviewed by U.S. officials. If approved, Japan may decide to produce the system in Japan, as they are licensed to do with the PAC-2.

Foreign Military Sales Purchases

Two countries, Saudi Arabia and Kuwait, have made direct purchases via FMS procedures. Saudi Arabia purchased twenty Patriot Fire Units valued at about \$1.5 billion without any offset agreement. Kuwait purchased five Fire Units valued at about \$780 million with an offset agreement still under negotiation.

Prospective Purchases

Several other countries have reportedly expressed an interest in acquiring Patriot systems, including Greece, Turkey, Egypt, UAE, Qatar, Bahrain, South

Korea, Taiwan, and Singapore. Details of these negotiations and likely outcome remain unavailable.

Cooperation With New U.S. TMD Capabilities

Several countries could acquire more advanced U.S. TMD capabilities in the future. The pattern of cooperation with the United States to date shows that U.S. allies and friends prefer to acquire missile defense systems that are already deployed, with accompanying offset agreements. For example, if France determined that it required an effective, wide-area defense system, it might enter into some collaborative acquisition arrangement with the United States once this country had acquired such a system.²²

Although any U.S. ally or friend could probably acquire some future U.S. TMD system, some countries are in a better position than others to take advantage of prospective U.S. TMD capabilities. For example, Japan is in a position to purchase or enter a cooperative arrangement for systems being developed by the United States. More specifically, Japan already has Patriot systems that could be upgraded with the more advanced PAC-3 missile when it is available. Japan has procured two Aegis-class destroyers (and will purchase two more) that could be upgraded with advanced U.S. maritime TMD missiles--if the United States decides to develop and deploy that capability. Also, Japan has purchased several AWACS early warning planes that could be used as sensors in a TMD system. Some U.S. estimates for upgrading Japan's TMD capabilities range from \$2 billion to \$10 billion.²³

Japan already operates six units of Patriot PAC-1 missiles, as well as the Hawk anti-aircraft missile system, and is upgrading the Patriots with PAC-2 technology for limited defense against tactical ballistic missiles. PAC-2 systems are scheduled to become operational beginning in 1995. Moreover, U.S. Secretary of Defense William Perry has proposed that Japan enter into codevelopment of advanced antimissile systems such as THAAD, a subject of ongoing negotiations since May 1993. A decision is expected sometime this year. Japanese officials are interested in TMD systems for North Korean and Chinese regional threats, but insist that a variety of legal, political, and trade issues must be resolved first. Moreover, some Japanese officials remain skeptical of THAAD's capabilities.²⁴

²² Interviews with French officials. June 1993.

²³ See Loveche, Joseph. \$2 Billion Would Give Japanese Scud-Busting Capability. *Defense Week*. July 12, 1993. p. 7.

²⁴ Sadaaki Numata, Deputy Director-General for Public Information at the Japanese Ministry of Foreign Affairs, has stated that the "key question is how effective will the systems be? Will they actually work?" See Opall, Barbara. Japan Resists Joint Missile Defense. *Defense News*. December 13-19, 1993. pp. 4, 37.

Then-Japanese Prime Minister Hosokawa came under intense political pressure and domestic criticism for purchasing the Patriot system. It is uncertain how or whether Japan might participate in THAAD development or acquisition. Further Patriot upgrades, and the Navy's upper-tier and/or lower-tier missile defense programs are also candidates for Japanese TMD efforts.

There are a number of key decision variables involved in making this decision for Japan. First, the Japanese Army and Navy each are vying for land- and sea-based systems, respectively, but it is unclear which will achieve its objectives. Second, there are significant problems regarding inter-service cooperation. This is especially problematic given communications coordination requirements for a possible naval role when coupled with Japanese ground-based Patriot deployments. Third, with the U.S. emphasis on the so-called "Technology for Technology Initiative" (previously known as the Perry Initiative), the degree to which Japanese business cooperates and participates with the Japanese government, as well as with U.S. government and industry, also remains a significant question to be resolved. Moreover, it is significant that there is no visible high-profile advocate for TMD in Japan, perhaps in part because the Japanese Defense Agency ranks below the Ministries of Foreign Affairs, Finance, and International Trade and Industry in relative bargaining power. Also, the tenuous and fragmented seven-party ruling coalition afforded Prime Minister Hosokawa little maneuvering room or bargaining leverage.

Whereas the Japanese defense budget is still increasing, the 1994 defense budget of \$44.6 billion contains the smallest increase since 1960.²⁵ As such, a popular Japanese perception may be that there are more urgent short-term priorities than TMD. This notwithstanding, an executive branch Commission has been established by Japan to detail its TMD options. The Commission is charged with reporting its findings to the government in June. The Commission's recommendations will be taken into consideration when preparing the 1996-2000 defense budget, a document that will be submitted by the end of this year. Cost, environmental issues, safety concerns, and domestic politics are all other major concerns cited by the Japanese. Moreover, significant defense-related questions exist over the space-basing of military systems and trans-Pacific collective security arrangements. In sum, as one U.S. official observed, "Japan is very serious [about TMD], but we haven't seen the color of their money."²⁶

In addition to Japan, South Korea apparently is also considering participation in the THAAD program, although they have so far not responded to U.S. Deputy Secretary of Defense John Deutch's invitation to join U.S. TMD efforts. Moreover, although South Korea had considered purchasing seven PAC-

²⁵ See Aviation Week & Space Technology. March 7, 1994. p. 41.

²⁶ Interview with Pentagon officials, April 1994.

2 missile batteries for roughly \$600 million from the Raytheon Corporation,²⁷ it was recently announced that South Korea will not acquire any at this time. Said ROK Defense Minister Rhee Byoung-tae, "we should be prudent in making the decision in order not to provide North Korea with a pretext on the nuclear issue."²⁸ Given potential hostilities on the peninsula, President Clinton authorized in March 1994 the transfer of a Patriot missile battalion to South Korea to augment the capabilities of U.S. forces already in place.²⁹

In contrast to Japan and South Korea, however, many U.S. allies and friends may be satisfied with existing U.S. alliance and security commitments. This means that future advanced TMD capabilities might be provided or guaranteed by the United States. Under these conditions, the costs to allies and friends probably would be minimal.

COOPERATION WITH REGIONAL PARTNERS

For the most part, U.S. allies and friends argue that they can not go it alone on TMD for several reasons. (Israel may be the single exception.) First, allies and friends do not believe they possess the technological capability to build advanced TMD systems better or more affordably than the United States. Second, they do not believe they have the resources to conduct an expensive TMD effort by themselves. As a result some believe that acquiring advanced TMD capabilities should await completion of current U.S. TMD initiatives. At that point some countries (e.g., Japan, Saudi Arabia, and the United Kingdom) may choose to purchase U.S. systems outright. Others, such as France, suggest that if such defenses were required they might pursue some cooperative production arrangements with the United States. As mentioned earlier, Germany apparently is not interested in acquiring a dedicated TMD system.

Because of these strongly held perceptions, there are few cooperative TMD-related efforts among the allies. A couple should be mentioned, however. France and Italy are proceeding with the EUROSAM program, a joint venture by Aerospatiale, Thomson-CSF, and Alenia, aimed at developing a naval (SAMP-N) and ground-based (SAMP-T) follow-on to the U.S. Hawk air-defense missile

²⁷ See Opall, Barbara. U.S. Urges South Korea To Purchase Own Patriot Missiles. Defense News. January 31-February 6, 1994. p. 18.

²⁸ See Kiernan, Terrence. South Korea Has No Plans To Buy Patriot. Defense News. February 28-March 6, 1994. p. 22.

²⁹ For a more complete description of U.S. military posture in South Korea, see Collins, John M. U.S. Library of Congress. Congressional Research Service. Korean Crisis, 1994: Military Geography, Military Balance, Military Options. CRS Report for Congress 94-311S. April 11, 1994.

system.³⁰ The SAMP-T could eventually have some TMD capability, but France and Italy stress they have not yet made this commitment.³¹ Both countries' budget support for the air-defense follow-on currently is minimal. Precise research and development costs are not available, although estimates range from about \$50 million to \$150 million over the next several years. Germany had at one time expressed interest, but decided that the system might be too limited. Meanwhile, Germany awaits the outcome of this research and later may determine if SAMP-T can be adapted for German use.

Additionally, there have been discussions between Matra and Antey, French and Russian aerospace firms, respectively, regarding the prospects for future cooperative development of a West European antiballistic missile system based on the Russian SA-12 surface-to-air missile.³² The SA-12 has been extensively tested, reportedly having characteristics similar to the PAC-2. (In the 1980s, some believed that the SA-12 could counter theater ballistic missiles with ranges up to 1,000 kilometers; to the Reagan Administration it represented a potential ABM system.)³³ For some, such a joint development could conceivably provide European Union (especially southern tier) members with a ballistic missile wide area defense capability much earlier and more cheaply than EUROSAM.

Although not being developed specifically as an element of a future TMD system, France, Spain, and Italy are developing and deploying the Helios reconnaissance satellite, which could contribute to a TMD early-warning system supporting intelligence requirements. Its costs are estimated to be about \$1.4 billion.³⁴ The first satellite is planned for launch in 1994 and the second in 1998-99.

In addition to these efforts, NATO and the Western European Union (WEU) have studied theater missile defense issues for several years. A report issued November 1993, "NATO Ballistic Missile Defense In the Post-Cold War Era," recommended that NATO enhance existing capabilities such as the Patriot

³⁰ For example, see de Briganti, Giovanni: Europe Debates its Own ATBM System. Defense News. April 26-May 2, 1993. pp. 3, 29; and de Briganti, Giovanni: Two French Contracts Will Explore New ATBMs. Defense News. Sept. 30, 1991. p. 24.

³¹ Interviews with French and Pentagon officials, June 1993.

³² See Covault, Craig. Russian SA-12 Missiles Eyed For European ABM. Aviation Week & Space Technology. September 13, 1993. p. 99.

³³ See Hildreth, Steven A. U.S. Library of Congress. Congressional Research Service. The Patriot Air Defense System and the Search for an Antitactical Ballistic Missile Defense. CRS Report for Congress 91-456F. June 18, 1991. pp. 41-43.

³⁴ See Proliferation and Missile Defense: European-Allied and Israeli Perspectives, p. 10.

and determine options to meet long-term threats, including the continental defense of Europe. The study recommended that NATO establish a missile defense system by 2005 to meet emerging and increasing ballistic missile-capable states with potentially hostile intentions.³⁵

But NATO members have not yet reached a consensus on specific strategies, goals, or the appropriate time frame involved. At the January 1994 Brussels Summit, NATO leaders rejected then-Secretary of Defense Aspin's eight-point counter-proliferation plan as a model for NATO policy, largely because of its support for preemptive strikes and reliance on theater missile defenses.³⁶ This notwithstanding, the final communique asserted that the:

proliferation of weapons of mass destruction and their delivery means constitutes a threat to international security and is a matter of concern to NATO. We have decided to intensify and expand NATO's political and defence efforts against proliferation, taking into account the work already underway in other international fora and institutions. In this regard, we direct that work begin immediately in appropriate fora of the Alliance to develop an overall policy framework to consider how to reinforce ongoing prevention efforts and how to reduce the proliferation threat and protect against it.³⁷

Accordingly, NATO established three key committees in the wake of the Summit to study this issue.³⁸

³⁵ See Lovece, Joseph. NATO Study Urges Allies To Draft Missile Defense Requirements. Defense Week. February 7, 1994. pp. 1, 13.

³⁶ See NATO Forms Groups To Study Counter-Proliferation Policy. Inside the Pentagon. February 24, 1994. p. 3.

³⁷ Final communique, article 17: "Declaration of the Heads of State and Government Participating in the Meeting of the North Atlantic Council Held At NATO Headquarters, Brussels, On 10-11 January 1994."

³⁸ The policy-making committee is chaired by NATO Assistant Secretary-General for Political Affairs, Gerhardt von Moltke, and composed of representatives from allied foreign and defense ministries. It will focus on developing joint approaches to significant non-proliferation questions, including a framework of goals. A second committee, composed of defense experts, will address the more technical questions of preventing proliferation. U.S. Assistant Secretary of Defense for Nuclear Security and Counter-proliferation, Ashton Carter, is co-chairman of this military working group. The third group is a senior-level steering committee chaired by NATO's Deputy Secretary-General, Sergio Balanzino, and is charged with coordinating the activities of the other two committees.

Previously, then-Under Secretary of Defense for Acquisition, John Deutch, suggested at the October 1993 Conference of National Armaments Directors (CNAD) that TMD was one of five areas where cooperation was both possible and desirable. (CNAD is comprised of arms acquisition chiefs from the sixteen member nations, and is charged with promoting allied armaments cooperation.) The working group created in the aftermath of this meeting is not comprised of all NATO members, but rather is available for members with both the perceived need and resources to contribute: U.S., U.K., Germany, France, Italy, the Netherlands, and Canada. This working group focuses on finding lower-cost, nearer term projects that might enable cooperative TMD efforts. With only one year left before the working group is scheduled to disband, however, it has not yet addressed the major problem of how to go about developing a system concerned with the defense of Europe instead of only providing cover for NATO forces engaged in out-of-area operations.³⁹

In addition, the WEU has moved to develop a joint unified position or requirement for TMD.⁴⁰ In June 1993, the WEU sponsored a symposium in Rome to discuss Europe's TMD options, emphasizing potential system architecture and costs. Resultant is the WEU focus on a theater defense system composed of several satellites for launch detection, a ground-based fire-control system with long-range radar, and a ground-launched anti-missile weapon. To maximize its potential usefulness against a variety of threats, the WEU concept foresees a requirement for mobility to provide coverage for expeditionary forces as well as for land areas. Such a system would ideally be complementary to and integrated with WEU members' national systems.⁴¹ No consensus or agreement has been reached, however.

INDIGENOUS PROGRAMS

Only a few U.S. allies and friends are pursuing TMD projects by themselves. Almost all these efforts are related to upgrading existing air-defense capabilities within these countries. One other program, the Israeli Arrow missile, might be pursued indigenously if the United States ends its budget support of the program. These programs are discussed briefly below.

³⁹ Interview with Pentagon officials, April 1994.

⁴⁰ See, Union Calls for Antimissile Network. Agence Europe. April 23, 1993. Translated in JPRS--TND-93-004-L, May 13, 1993. p. 21. Assembly of WEU Asks Council to Come Up With European Position on GPALS. Inside the Army. Jan. 11, 1993. pp. 19-20; and WEU to Look Into Early Warning Center, European Defense System. Inside the Army. June 28, 1993.

⁴¹ William Smith. Theatre Ballistic Missile Defence For Europe. Nato's Sixteen Nations, no. 5/6, 1993. pp. 45-51.

Air-Defense Upgrades

There are several programs underway to replace aging air-defense systems. According to research and development plans, each program has some potential for acquiring limited TMD capabilities. Most of the research budgets support the air-defense upgrade; relatively little supports a TMD growth path.

Europe

Germany is pursuing the TLVS (Taktische Luft Verteidigungs System) to meet their requirements for a follow-on to the Hawk air defense system and to provide defenses against tactical, air-to-ground, and cruise missiles. The program is preparing to enter the demonstration and validation phase, which would precede a procurement decision in about 1997. This phase, 1994-1996, will cost between \$63 and \$125 million; the total research and development program is estimated at about \$410 million. Germany, however, is not committed to TLVS procurement, which has an estimated cost of \$1.9 billion to equip nine battalions with four TLVS systems each.⁴² Rather than make a commitment to TLVS at this time, Germany awaits the outcome of the French and Italian EUROSAM effort and the U.S. Corps SAM program. Regarding the latter, there have been a number of bilateral U.S.-German discussions over joint development of Corps SAM, but no commitment has been made. A few observers believe that some type of German commitment to Corps SAM development or acquisition could be made in 1994.⁴³

The United Kingdom wants to replace its aging Bloodhound missiles with the MSAM (Medium Surface-to-Air Missile), although no time frame is available. Reportedly, MSAM could acquire limited TMD capabilities through additional research and development. Although the United Kingdom apparently spent about \$3 million to examine the need for giving MSAM a TMD capability, it has not committed yet to fill that requirement. Several international aerospace groups are competing for the MSAM contract.

Some reports indicate that European government and industry officials are considering a larger NATO-wide program which would merge the EUROSAM, Corps SAM, TLVS, and Bloodhound missile programs. Proponents of such a measure point to the overwhelming cost and unnecessary expenditures involved in developing each program independently, and argue that although the systems' relative capabilities differ, each is designed for a similar purpose: to destroy

⁴² Cost figures were provided by the German Government to CRS, June 1993.

⁴³ U.S. Deputy Secretary of Defense, John Deutch, recently stated that he is willing to move forward with his German counterparts on discussion for co-development of CORPS SAM "without delay." See Deutch Tells Germans U.S. Is Willing To Adjust CORPS SAM Schedule. *Inside the Army*. March 14, 1994. p. 3; also, see U.S. and Germany Inch Closer To Decision On CORPS SAM Cooperation. *Inside the Army*. November 1, 1993. p. 3.

aircraft as well as some types of ballistic missiles. As Etienne Lefort, managing director of the EUROSAM program, has stated, "We are all looking at [developing antimissile weapons] defense, and it looks increasingly likely that such a system must be trans-Atlantic."⁴⁴ Again, no decision has been reached.

Asia

Among U.S. friends in East Asia there have also been serious discussions regarding air defense upgrades. Japan, for instance, is developing (through the Japanese Defense Agency) a HAWK air-defense replacement using the concept developed under a program called Future SAM. This system also has growth potential as a TMD system against short-range missile threats after the year 2000. Reliable budget figures for this effort are not available, but are reported to be minimal. Some assume the Japanese will build on their experience with production of the Patriot system,⁴⁵ although participation in THAAD and/or the U.S. Navy's upper- or lower-tier missile defense systems is also possible.

Taiwan is also actively interested in acquiring TMD, and entered into negotiations last year with Raytheon and the U.S. Government to co-produce the Modern Air Defense System (MADS).⁴⁶ The fate of the \$1.3 billion deal remains uncertain, however, as Taiwanese officials have cited high program costs, relatively limited capabilities, and U.S. refusals to transfer the latest antimissile technology, in their arguments to withdraw from the deal. As Taiwanese Admiral Ku Chung-Lien surmised, "at a time when it is becoming increasingly difficult to ask for the budget from our Congress, how can we justify spending so much money for a system that has only a limited capability against a real and present threat?"⁴⁷ Specifically, these officials assert that PAC-2 capability is inadequate, and must be supplanted with the latest PAC-3 technology.

As an alternative to MADS, it appears that Taiwan may press ahead with the development and testing of indigenous air missile defense systems. Reportedly, the Tien Kung 1 (Sky Bow 1) missile successfully intercepted a short-range missile in 1985. The Tien Kung 2 missile (Sky Bow 2) is designed for higher altitude interceptions. While negotiations over MADS continue, Taiwan will continue to research and develop the TK-2 air defense missile,

⁴⁴ De Briganti, Giovanni and Neil Munro. Europeans Mull Merger of Air Defense Programs. *Defense News*. March 14-20, 1994. pp. 1, 34.

⁴⁵ See Lennox, Duncan. ATBMs and Beyond. *Jane's Defense Weekly*. May 22, 1993. p. 22.

⁴⁶ Ibid. Also, see Karniol, Robert. Taipei Confirms MADS talks in Progress. *Jane's Defense Weekly*. July 17, 1993. p. 9.

⁴⁷ See Opall, Barbara. Taiwan Balks At U.S. Deal For Patriot. *Defense News*. August 30-September 5, 1993. pp. 1, 28.

which is designed by the government's Chung Shan Institute of Science and Technology.⁴⁸

Dedicated Theater Missile Defenses

The Israeli Arrow missile is included in this discussion because it may be deployed as an indigenously produced TMD system. There are two reasons for this. First, continued U.S. support is in doubt. The BMDO has indicated that it will not provide continued support of Arrow beyond some point in the research and development phase.⁴⁹ They argue that the United States has gained what it can technologically⁵⁰ from funding the Israeli effort to date, and that the United States has no plans to deploy the system itself. As one U.S. official stated, "we have no operational requirement for that system."⁵¹ Second, at the same time, there appears to be a growing commitment within Israel to continue with production and eventual deployment of a nation-wide Arrow system beginning in the mid-to-late 1990s.⁵²

Thus far, the United States has provided almost all of the funding for the Arrow program.⁵³ The United States provided \$126 million for its share of the first Arrow contract, as well as 25 percent of Israel's \$31 million share of the contract from U.S. grant aid. The United States will provide \$231 million for its share of the current (second) Arrow contract. A full "100 percent of Israel's \$90 million share will likely be funded from U.S. grant aid. In addition, the

⁴⁸ It is possible that Taiwan will continue concurrent development of both the MADS and TK-2 programs. One Taiwanese official has stated that cost remains the major determining factor for the country's participation in MADS. Both negotiations with Raytheon over MADS and discussion over next year's defense budget continue, with no apparent immediately forthcoming resolution in sight. Interview, April 1994.

⁴⁹ Interviews with BMDO officials, June 1993 and April 1994.

⁵⁰ It should be noted that the United States reportedly has received some very useful technology from Israel, especially in regard to unmanned aerial vehicles (UAVs)--a field where Israeli aerospace technology is quite competitive. See Best, Richard A. U.S. Library of Congress. Congressional Research Service. Intelligence Technology in the Post-Cold War Era: The Role of Unmanned Aerial Vehicles (UAVs). Report for Congress 93-686F. July 26, 1993.

⁵¹ Interview with Pentagon officials, April 1994.

⁵² See Loveche, Joseph. Israel Decides to Purchase the Arrow Scud-Busting Missile. Defense Week. May 17, 1993. p. 9; and Sandler, Neal: Big Boost for IAI. The Jerusalem Report. March 25, 1993. pp. 36-37.

⁵³ See, General Accounting Office. Letter to Hon. Howell Heflin (on Arrow program costs). April 19, 1993.

United States is funding \$36.6 million in project management costs . . . [and is additionally funding] smaller contracts related to the Arrow system."⁵⁴

In the FY94 National Defense Authorization Act (P.L. 103-160), Congress approved the requested \$56.4 million Arrow Continuing Experiments Initiative budget for FY94. It directed, however, that \$25 million in R&D funds for the so-called Arrow Deployability Initiative--future Arrow technological efforts such as battle management, lethality, system integration, and test bed systems--be obligated in accordance with the following conditions. First, an agreement must be reached between the United States and Israel governing the conduct and funding of such R&D efforts. Second, the United States may participate only in projects that will have a benefit for the United States and have not been barred by other congressional direction. Third, the Arrow missile must "successfully complete" a flight test in which it intercepts a target missile under realistic test conditions. Fourth, Israel must continue to adhere to export controls pursuant to the guidelines of the Missile Technology Control Regime.

Lastly, the U.S. Secretary of Defense must submit a report to Congress on the Arrow program, including development and procurement schedules for the program; projected overall costs of the program; estimated defense needs of Israel; missile performance assessments; an evaluation of the performance of the Arrow interceptor and Arrow system; and alternatives to the Arrow missile program that could meet Israel's ballistic missile defense needs. This report must also include an assessment of the option of providing Israel with an existing or planned system, emphasizing cost estimates as well as technology and weapons proliferation implications for each alternative.

The BMDO has slated about \$400 million for the Arrow program between FY 1994-1999, but it has not yet been decided who will continue to fund the Arrow program--whether it be Israel or some partner, or both. It has been reported that completion of Arrow's development and production might cost \$1.2 to \$5.9 billion.⁵⁵ Testing on the Arrow 2 missile was to begin on March 3, 1994, but the flight test was canceled because test site ground equipment malfunctioned. This was one of three tests scheduled for FY94.⁵⁶ None of the Arrow tests to date has been an unqualified success.

⁵⁴ Ibid.

⁵⁵ According to one Israeli source, \$1.2 billion would be needed over the next ten years to develop and build 300 Arrow missiles and associated infrastructure. Another Israeli source, however, put the costs at between \$3.9 billion and \$5.9 billion. See Opall, Barbara and Parnes, Sharon. Test Halt Casts Shadow on Arrow. Defense News. July 19-25, 1993. pp. 4, 50. Previous estimates of completing the Arrow program and fielding the system ranged from \$2 billion to \$10 billion.

⁵⁶ See Lovece, Joseph. Missile Defense Office To Study How Israel Can Field Arrow. Defense Week. March 21, 1994. p. 6.

CONSTRAINTS

U.S. friends and allies give several other reasons for not supporting TMD efforts with greater commitment. These reasons can be placed into four categories: budget constraints, political constraints, barriers to international technology cooperation with the United States, and concerns regarding the efficacy of available technology. These points are discussed briefly below.

BUDGETARY

Almost all the countries discussed, especially those in Europe, feel constrained in their development of TMD systems by the need to reduce defense budgets overall. Hence there is little resource commitment to TMD among U.S. allies and friends. Israel's defense budget is similarly constrained, but it may decide that TMD takes priority among current and prospective defense needs. Some have argued that European countries could take a similar position: declining defense budgets could include vigorous TMD development if TMD were indeed a national priority. Japan has one of the few defense budgets that is still growing, albeit at a pace slower than in the 1980s. It is possible that Japan could support a strong TMD effort within its defense budget.

POLITICAL

As mentioned earlier, a few countries may feel constrained politically from open debate over TMD (i.e., France because of its large population of northern Africans, Italy, and perhaps Turkey). Most all the other countries do not appear to be similarly constrained. In some cases, a few countries, such as France and Japan, will be going through a change of political leadership. Some have suggested that interest in TMD may be put on hold until such leadership issues are settled. The former Soviet opposition to advanced Western missile defense programs, and therefore some European reluctance to pursue such programs, has disappeared, however.

BARRIERS TO TECHNOLOGY COOPERATION

Several countries have identified the following factors as barriers to international technological cooperation in theater missile defense:⁵⁷ 1) international restrictions on technology transfer, 2) differing TMD requirements among potential partners, 3) the U.S. export control process (cumbersome export licensing procedures and the decentralized nature of the system), and 4) the need for greater unity of effort regarding U.S. policy (proliferation of agencies and interests involved in foreign technology cooperation projects). Another

⁵⁷ See Fujito, Wayne T. *Overcoming the Many Barriers to International Cooperation in Theater Missile Defense*. International Technology and Trade Associates, Washington, D.C. (White Paper). 1993.

reason cited has been the traditional (perceived) lack of U.S. commitment to cooperative programs. This may be changing, however, based on the new cooperative technology and relaxed export control policies promoted by the Clinton Administration.⁵⁸

CONCERNS OVER TECHNOLOGICAL EFFICACY

In addition, some allies have demonstrated a reluctance to procure antitactical ballistic missile systems given the current state of technology. Whereas countries such as Japan purchased PAC-1 equipment--and have since upgraded it--other countries have instead decided to wait until the technology is improved significantly. Taiwan, for instance, may decide to wait until it can purchase PAC-3 technology, instead of participating in PAC-2-capable MADS. Similarly, Germany appears satisfied to await the outcome of several competing TMD programs before it makes any final commitment.

CONCLUSION

Several conclusions regarding the nature of allied participation with the United States on TMD are evident. First, there is continued study of missile threats and TMD among some allies and friends, but no definitive conclusions or decisions have been reached. The "pre-feasibility" study to be undertaken by the United Kingdom is an example of this, as is uncertainty over South Korean intentions with respect to participation in THAAD. Moreover, both the WEU and NATO have expressed interest in TMD and subsequently formed committees to deliberate the nature of missile threats and the appropriate TMD options; but concrete, collaborative policy decisions have yet to be made.

Second, there appears to be movement on some TMD efforts, but there is no corresponding commitment to develop or acquire additional TMD capabilities. The recently authored French White Paper, in addition to Franco-Russian corporate negotiations and French exploratory funding for TMD options, underscore a new French willingness to address with defensive measures growing concerns over proliferation. The Germans, and to a greater extent the Japanese, have suggested an interest in TMD, and are actively exploring their relative options. Specifically, the Japanese have requested PAC-3 technology when available, and may participate in THAAD or the Navy upper-tier program. Whereas French, German, and Japanese policymakers may be interested, again no decisions have been made on TMD acquisition strategies.

Third, there appears to be TMD program evolution in one country, but little real progress. The Israeli Arrow missile program has yet to achieve an

⁵⁸ In an April meeting in Brussels, then-U.S. Under Secretary of Defense for Acquisition, John Deutch, announced greater willingness to foster cooperative initiatives and multilateral cooperation. See Pentagon Presses Burden Sharing on Theater Missile Defense Efforts. Defense News. May 17-23, 1993. p. 12.

unqualified successful test. Whereas the government of Israel has professed clearly an intention to procure the Arrow, there remains a clear discrepancy between operational requirements and system performance. Also, there remains uncertainty as to who will pay to acquire this system.

Finally, the point should be made that there is little comparison to how much the United States plans to spend on TMD over the next five years (estimated at about \$18 billion) and what all U.S. friends and allies combined may spend in the same time frame (perhaps as much as \$1 to \$2 billion, given what is now known or projected).⁵⁹ Although there may be several reasons for the relatively lower spending for TMD among U.S. allies and friends, there appears to be two principal related reasons: threat perception and budget priorities. Most U.S. allies and friends do not appear to share the concern over missile proliferation espoused by many U.S. policymakers. Hence, the defense budgets of U.S. friends and allies do not reflect TMD priorities.

Therefore, inasmuch as many U.S. policymakers want to see greater allied participation in the cost burden of the U.S. TMD effort, including perhaps shared development costs or technological contributions,⁶⁰ U.S. friends and allies do not appear likely in the near-term to make any specific or strong commitments to the U.S. effort. Some in the United States are working to involve U.S. allies and friends more actively, especially in the development of TMD systems. But, in part, because of a perceived slowness on the part of U.S. allies and friends to commit to U.S. TMD programs (which some U.S. allies and friends have said they might be interested in acquiring or participating in at a later date), there is reduced political support for those programs in this country. Current reluctance on the part of U.S. friends and allies to commit to TMD development and acquisition may even work to foreclose certain TMD options for them. In the future, therefore, the primary theater missile defense of many countries may be simply to rely on the security guarantees provided by the United States, which would include those TMD capabilities obtained by the United States.

⁵⁹ This figure includes what is known or estimated (perhaps a few million dollars for the United Kingdom, and several million dollars for Germany), and what might be projected (perhaps as much as several hundred million dollars each for France, Japan, and Israel--if they acquire Arrow with their own funds).

⁶⁰ Defense News. One On One: John Deutch. January 31-February 6, 1994. p. 22.